REMARKS

Applicant respectfully requests reconsideration of the present U.S. Patent application. No claims have been added or cancelled. Claims 1, 17, and 18 have been amended. Thus, claims 1-24 are pending.

SPECIFICATION

The Office Action noted that reference numeral 120 shown in FIG. 1 was not mentioned in the description. The Office Action proposed either amending FIG. 1 or amending the Specification to refer to reference numeral 120. In response, Applicant has amended the Specification to refer to reference numeral 120. Therefore, Applicant respectfully requests that the objection to the drawings be withdrawn.

REJECTIONS UNDER 35 U.S.C. § 112, SECOND PARAGRAPH

Claim 17 was rejected under 35 U.S.C. § 112 because the claim depended from itself. In response, Applicant has amended claim 17 so that it depends from claim 16. Applicant respectfully submits that claim 17, as filed, depended from itself due to a typographical error. Applicant also corrected typographical errors in claim 1 and claim 18. Applicant respectfully submits that claims 1, 17, and 18 are allowable and such action is earnestly requested.

REJECTIONS UNDER 35 U.S.C. § 103(a)

Claims 1-5, 10-16, 18-20, and 23-24 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,181,699 B1 issued to Crinion, et al. (*Crinion*) in view of William S. Biedron, "Metropolitan Area Network Services Comprised of Virtual Local Area Networks Running Over Hybrid-Fiber/Coax and Asynchronous Transfer Mode Technologies," in *Proceedings of the International Society of Optical Engineering*, Vol. 2609, Paper No. 2609-

06 (*Biedron*). For at least the reasons set forth below, Applicant submits that claims 1-5, 10-16, 18-20, and 23-24 are not rendered obvious in view of *Crinion* and *Biedron*.

The Manual of Patent Examining Procedure ("MPEP"), in § 706.02(j), states:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second there must be a reasonable expectation of success. Finally, **the prior art reference** (or references when combined) **must teach or suggest all the claim limitations**. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must be both found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

(Emphasis added). Thus, the MPEP and applicable case law require that a combination of references teach or suggest all of the claim limitations of rejected claims to sustain an obviousness rejection under 35 U.S.C. § 103.

Claim 1 recites:

> an edge switch connecting the MAN to a super-VLAN, the super-VLAN comprising at least one of a plurality of sub-VLANs, and wherein the edge switch applies a modified bridge forwarding rule to **exchange a VLAN ID associated with the sub-VLAN for a VLAN ID associated with the super-VLAN** before forwarding a data packet from the sub-VLAN over the MAN using the at least one of a router and a switch.

(Emphasis added). Claim 12, 18, 19, and 20 similarly recite exchanging a sub-VLAN ID for a super-VLAN ID.

Crinion discloses:

> ...providing a circuit for assigning VLAN tags based on data frame information in addition to the port on which the data frame was received.

See column 1, lines 45-47. Thus, *Crinion* relates to a circuit that assigns VLAN tags based on (1) the port that receives the frame and (2) data frame information. *Crinion* does not, however, teach or suggest exchanging a sub-VLAN ID for a super-VLAN ID.

Biedron is cited as teaching a Metropolitan Area Network (MAN) including a router and a switch. Whether or not *Biedron* discloses such a system, it does not teach or suggest exchanging a sub-VLAN ID for a super-VLAN ID. Thus, *Biedron* does not cure the deficiencies of *Crinion*. Applicant, therefore respectfully submits that no combination of *Crinion* with *Biedron* renders independent claims 1, 12, 18, 19, and 20 obvious for at least the reason that neither *Crinion* nor *Biedron* teaches or suggests exchanging a sub-VLAN ID for a super-VLAN ID.

The Examiner rejected dependent claim 2 and directs the Applicant's attention to column 2, lines 55-57; column 6, lines 4-9; column 10, lines 2-4; and column 13, lines 40-44, wherein *Crinion* discloses:

> Content addressable memory 110 stores tagging part of which is to be inserted into frames to enable VLAN functionality.
>
> As further described below, a frame may be processed by an internal receive CAM which can assign a VLAN tag to frames based upon source address (SA), destination address (DA), or protocol information (such as the TYPE field).
>
> The look up engine forwards or filters packets based on PDX configuration, packet type, and stored address, port and VLAN information.
>
> If a packet is received whose destination address matches one of the stored multicast addresses, then, before the packet is sent onto the switch bus, the VLAN tag field is overwritten with the tag associated with that multicast, rather than the default tag for the receive port.

The Examiner argues that the cited passages teach a modified MAC address learning rule to **prevent a data packet** from one sub-VLAN from being forwarded to a different sub-VLAN , the MAC address learning rule comprising a MAC address entry in a forwarding data base (FDB) **for each** of the plurality of sub-VLANs and a super-VLAN. The Applicant respectfully disagrees.

The cited passages of *Crinion* merely recite the use of VLAN tags. The cited passages do not, however, discuss **preventing** a data packet from one sub-VLAN from being forwarded to a different sub-VLAN. Also, the cited passages do not discuss MAC address entries in a FDB **for each** of a plurality of sub-VLANs and a super-VLAN. Therefore, the Applicant finds nothing in the cited passages of *Crinion* that disclose a "modified bridge media access control (MAC) address learning rule to **prevent the data packet** from the sub-VLAN from being forwarded to a different sub-VLAN , the MAC address learning rule comprising a MAC address entry in a forwarding data base (FDB) **for each** of the plurality of sub-VLANs and the super-VLAN." Applicant, therefore, respectfully requests that the Examiner withdraw his rejection of claim 2.

Regarding dependent claims 3-4, the Examiner argues that *Crinion* teaches that a MAC address entry is added to a FDB for a sub-VLAN and a super-VLAN when a new MAC address is learned from the sub-VLAN. The Examiner further argues that *Crinion* teaches that a MAC address entry is added to a FDB for each of a plurality of sub-VLANs and a super-VLAN when the new MAC address is learned from the super-VLAN. The Examiner directs the Applicant's attention to seven sections of *Crinion* in support of his argument. The Applicant respectfully disagrees.

The cited passages of *Crinion* do not disclose that a MAC address "entry is added to the FDB for the sub-VLAN **and** the super-VLAN **when a new MAC address is learned from the sub-VLAN,**" as recited in claim 3. Also, the cited passages of *Crinion* do not disclose that a "MAC address entry is added to the FDB **for each** of the plurality of sub-VLANs and the super-VLAN **when the new MAC address is learned from the super-VLAN,**" as recited in claim 4. Since *Crinion* does not disclose the above-stated limitations, the Applicant respectfully submits

that *Crinion* does not disclose what the Examiner argues it discloses. Applicant, therefore, respectfully requests that the Examiner withdraw his rejection of claims 3-4.

The Examiner rejected dependent claim 5 and directs the Applicant's attention to column 3, lines 32-43, wherein *Crinion* discloses:

> If the frame lacks a tag, or if tag replacement is desired, search circuit 130 searches the lookup data in content addressable memory 110 for the frame information. Once it has located the frame information, search circuit 130 reads the associated tag data. Tagging circuit 140 inserts a desired portion of the tag data into the frame in frame memory 120. Frame memory 120 then sends the frame for internal processing by the switch. Finally, before the frame is forwarded to other switches, detagging circuit 170 removes the inserted tag, if desired. The frame is then sent to the transmit ports of the switch.

The Examiner argues that the cited passage teaches that an edge switch applies a modified bridge forwarding rule to exchange a VLAN ID associated with a super-VLAN for a VLAN ID associated with a sub-VLAN before forwarding a data packet from the super-VLAN to a customer associated with the sub-VLAN. The Applicant respectfully disagrees.

The cited passage of *Crinion* merely discloses a circuit capable of locating and inserting a tag into a data packet. Sub-VLANs and super-VLANs are not discussed at all and an exchange of VLAN IDs between a sub-VLAN and a super-VLAN is clearly not discussed in the cited portion of *Crinion*. Therefore, the Applicant finds nothing in the cited passage of *Crinion* that discloses a "modified bridge forwarding rule to exchange a VLAN ID associated with the super-VLAN for a VLAN ID associated with the sub-VLAN," as recited in claim 5. Applicant, therefore, respectfully requests that the Examiner withdraw his rejection of claim 5.

The Examiner rejected independent claims 12 and 18 and directs the Applicant's attention to column 3, lines 30-35, wherein *Crinion* discloses:

> Briefly, circuit 100 operates as follows. The switch receives a frame. Frame memory 120 stores the frame. If the frame lacks a tag, or if tag replacement is desired, search circuit 130 searches the lookup data in content addressable memory 110 for the frame information.

The Examiner argues that the cited passage teaches classifying a data packet originating from a sub-VLAN in accordance with an aggregated VLAN configuration, the aggregated VLAN configuration associating the sub-VLAN with a sub-VLAN ID and a super-VLAN ID ... before forwarding the packet. The Applicant respectfully disagrees.

The cited passage of *Crinion* merely discloses receiving a frame and searching a memory for a tag corresponding to the frame. The cited passage does not discuss sub-VLAN and super-VLAN IDs and, specifically, does not disclose "classifying a data packet originating from a sub-VLAN in accordance with an aggregated VLAN configuration, the aggregated VLAN configuration **associating the sub-VLAN with a sub-VLAN ID and a super-VLAN ID,**" as recited in claims 12 and 18. Applicant, therefore, respectfully requests that the Examiner withdraw his rejections of claims 12 and 18.

The Examiner rejected dependent claim 13 and directs the Applicant's attention to column 13, lines 40-44, wherein *Crinion* discloses:

> If a packet is received whose destination address matches one of the stored multicast addresses, then, before the packet is sent onto the switch bus, the VLAN tag field is overwritten with the tag associated with that multicast, rather than the default tag for the receive port.

The Examiner argues that the cited passage teaches that classification comprises obtaining a sub-VLAN ID and a super-VLAN ID from a tag in the data packet, and verifying the obtained VLAN IDs in accordance with the aggregated VLAN configuration values stored in the switch that performs the classification. The Applicant respectfully disagrees.

The cited passage of *Crinion* merely discusses matching a destination address of a data packet with a multicast address. *Crinion* does not, however, disclose "**obtaining the sub-VLAN ID and the super-VLAN ID from a tag** in the data packet," as recited in claim 13. Applicant, therefore, respectfully requests that the Examiner withdraw his rejection of claim 13.

The Examiner rejected independent claim 19 and directs the Applicant's attention to column 1, lines 12-15 and column 5, lines 26-27, wherein *Crinion* discloses:

> Local area networks (LANs) of all types that are IEEE 802 compliant may be connected together with media access control (MAC) bridges, as specified in ISO/IEC 10038, as modified by supplement P802.1p.
>
> Port block 210 contains the IEEE 802.3 media access control (MAC) for both transmission and reception of Ethernet frame data.

The Examiner argues that the cited passages teach the processing of a data packet in accordance with the **exchanged** super-VLAN ID **and** destination Media Access Control (MAC) address **specified** in the data packet. The Applicant respectfully disagrees.

The cited passages merely discuss that LANs may be connected with MAC bridges and a port block that is IEEE 802.3 compliant. The cited passages, however, do not disclose an "exchanged super-VLAN ID" and, specifically, do not disclose "processing of the data packet ... in accordance with the exchanged super-VLAN ID and destination ... MAC address specified in the data packet," as recited in claim 19. Applicant, therefore, respectfully requests that the Examiner withdraw his rejection of claim 19.

Claims 2-5 and 10-11 depend from claim 1, claims 13-16 depend from claim 12, and claims 23-24 depend from claim 20. For at least the reasons stated above and that dependent claims include the limitations of the claims from which they depend, Applicant submits that claims 2-5, 10-11, 13-16, and 23-24 are not rendered obvious by *Crinion* in view of *Biedron*.

The Examiner rejected dependent claims 6-9 and 22 under 35 U.S.C. § 103(a) as being unpatentable over *Crinion* and *Biedron* in further view of U.S. Patent No. 5,394,402 issued to Ross (*Ross*). Specifically, the Examiner directs the Applicant's attention to column 10, lines 4-8, wherein *Ross* discloses:

> In this instance, the message with the VLAN designation appended is encapsulated in the appropriate format by the FPE 40 and forwarded to the external port for transmission on the backbone network.

The Examiner argues that the cited passage teaches a header encapsulating a data packet, and concludes "[i]t would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to employ the teachings of *Ross* within the system of *Crinion* and *Biedron*, by encapsulating data packet in an aggregated VLAN architecture, because this would allow for the switch to keep track of which sub-VLAN or super-VLAN the data packet came from, restrict other devices from knowledge, and use it to check the database for classification and referencing." The Applicant respectfully disagrees.

The cited passage of *Ross* merely discloses encapsulating a message in an appropriate format and forwarding the message to an external port for transmission. Obtaining a VLAN ID associated with a sub-VLAN or obtaining a VLAN ID associated with super-VLAN is not discussed. Therefore, Applicant finds nothing in the cited passage of *Ross* that discloses a "VLAN ID associated with the sub-VLAN is obtained from a header encapsulating the data packet" or "a VLAN ID associated with the super-VLAN is obtained from the header encapsulating the data packet," as recited in clams 6-9 and 22. Applicant, therefore, respectfully submits that no combination of *Crinion*, *Biedron*, and *Ross* renders claims 6-9 and 22 obvious.

The Examiner rejected dependent claim 21 under 35 U.S.C. § 103(a) as being unpatentable over *Crinion* and *Biedron* in further view of U.S. Patent No. 5,802,047 issued to Kinoshita (*Kinoshita*). Specifically, the Examiner directs the Applicant's attention to column 1, lines 39-41, wherein Kinoshita discloses:

> The packet "e" has a media access control (hereafter "MAC") header e1, which is followed by an internet protocol (hereafter "IP") datagram e5, as an upper protocol is IP.

The Examiner argues that the cited passage teaches a means for assigning a VLAN ID based on the contents of a data packet's source Internet Protocol (IP) address, and concludes that "it would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to employ the teachings of *Kinoshita* within the system of *Crinion* and *Biedron,* by assigning VLAN ID based on IP address within the edge switch system, because IP address is a unique identifying number assigned to each machine in an Internet." See Office Action, page 9, para. 6. The Applicant respectfully disagrees.

The cited passage of *Kinoshita* merely discloses a packet that includes an IP header, as is clearly depicted in the accompanying FIG. 4 of *Kinoshita.* The identity of VLANs is not discussed at all, much less how or whether to derive identity of super-VLANs or originating VLANs. Therefore, the Applicant finds nothing in the cited passage of Kinoshita that discloses "deriving the identity of a super-VLAN associated with an originating VLAN based on the contents of a data packet's source IP address," as recited in claim 21. Whether the IP address in the Kinoshita IP header is a unique identifying number assigned to each machine in an Internet is irrelevant.

Furthermore, claim 21 depends from independent claim 20 and is distinguishable over *Kinoshita* for at least the same reasons. Applicant, therefore, respectfully submits that no combination of *Crinion*, *Biedron*, and *Kinoshita* renders claim 21 obvious. Accordingly, the Applicant requests that the Examiner withdraw his rejection of claim 21.

CONCLUSION

For at least the foregoing reasons, Applicant submits that the rejections have been overcome. Therefore, claims 1-24 are in condition for allowance and such action is earnestly

solicited. The Examiner is respectfully requested to contact the undersigned by telephone if such contact would further the examination of the present application.

Please charge any shortages and credit any overcharges to our Deposit Account number 02-2666.

Respectfully submitted,
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MARKED VERSION OF THE AMENDED SPECIFICATION PARAGRAPHS

On page 7, please replace the paragraph starting on line 23 and ending on page 8, line 10 with:

In one aspect of the present invention, an aggregated VLAN architecture is used to create a virtual private network within a metropolitan area network (MAN), also referred to as a virtual MAN (VMAN). Referring now to **Figure 1**, wherein a block diagram overview of a MAN configuration and aggregated VLANs 120 in accordance with one embodiment of the present invention is shown. As illustrated, a MAN **100** includes a VMAN layer-2 switch **102** and/or a layer-3 router **104**. Multiple customers **110**, each having separate sub-VLANs, sub-VLAN 2 **122**, sub-VLAN 3 **124**, and sub-VLAN 4 **126**, are aggregated into super-VLAN 1 **130** by a layer-2 edge switch **128** located at the edge of the MAN **100**. As shown, the sub-VLANs **122**, **124**, and **126** are the customer-facing VLANs, whereas the super-VLAN **130** is the MAN-facing VLAN. The edge switch **128** forwards data packets originating from the customer sub-VLANs **122**, **124**, and **126** through the super-VLAN 1 **130** and over the MAN **100** using the VMAN layer-2 switch **102** or the layer-3 router **104**.

On page 8, please replace the paragraph starting on line 11 and ending on line 24 with:

In one embodiment, data packets originating from the sub-VLANs may be tagged with a VLAN ID using an 802.1Q tag or other type of tagging scheme. In another embodiment, the data packets are not tagged. Either way, the edge switch **128** aggregates the sub-VLANs **122**, **124**, and **126** into the super-VLAN **130** by classifying the tagged or untagged packets according to the aggregated VLAN **120** configuration. The aggregated VLAN 120 configuration is

typically pre-defined on the edge switch **128** by the MAN service provider, and is transparent to the individual customers whose VLANs are being aggregated. If the customer uses frame tagging, then the edge switch **128** simply verifies whether the VLAN ID specified in the data packet's 802.1Q tag is one of the configured VLAN IDs. If it is not one of the configured VLAN IDs according to the aggregated VLAN **120** configuration, then the data packet is rejected. If the data packet is untagged, then the edge switch will assign a VLAN ID to the data packet, again according to the aggregated VLAN **120** configuration.

On page 8, please replace the paragraph starting on line 25 and ending on page 9, line 7 with:

Similarly, data packets originating from the super-VLAN **130** may be tagged with a VLAN ID using an 802.1Q tag or other type of tagging scheme. In another embodiment, the data packets are not tagged. Either way, the edge switch **128** classifies the tagged or untagged packets according to the aggregated VLAN **120** configuration. If the data packet is tagged, then the edge switch **128** simply verifies whether the VLAN ID specified in the data packet's 802.1Q tag is the configured super-VLAN's VLAN ID. If not, then the data packet is rejected. If the data packet is untagged, then the edge switch will assign a super-VLAN VLAN ID to the data packet according to the aggregated VLAN **120** configuration.

On page 9, please replace the paragraph starting on line 8 and ending on line 11 with:

In one embodiment, the aggregated VLAN **120** configuration is composed of one sub-VLAN/VLAN ID for each customer and a single super-VLAN/VLAN ID. However, other

aggregated VLAN 120 configurations may be employed without departing from the principles of the invention.

IN THE CLAIMS

1. (Amended) An aggregated virtual local area network (VLAN) architecture system comprising:

a metropolitan area network [MAN] (MAN) having at least one of a router and a switch; and

an edge switch connecting the MAN to a super-VLAN, the super-VLAN comprising at least one of a plurality of sub-VLANs, and wherein the edge switch applies a modified bridge forwarding rule to exchange a VLAN ID associated with the sub-VLAN for a VLAN ID associated with the super-VLAN before forwarding a data packet from the sub-VLAN over the MAN using the at least one of a router and a switch.

17. (Amended) The method of claim [17] 16, wherein the modified MAC address learning rule comprises a MAC address entry in a table stored in the switch performing the classification, wherein the MAC address entry is added for each of the sub-VLAN and the super-VLAN when the MAC address is learned from the sub-VLAN, and wherein the MAC address entry is added for all of the plurality of sub-VLANs in the aggregated VLAN configuration and the super-VLAN when the MAC address is learned from the super-VLAN.

18. (Amended) An article of manufacture comprising [a machine-accessible medium having stored thereon a plurality of instructions for aggregating multiple VLANs in a metropolitan area network, comprising]:

an electronically accessible medium providing instructions for aggregating multiple VLANs in a metropolitan area network that, when executed by one or more processors, cause the one or more processors to

[classifying] classify a data packet originating from a sub-VLAN in accordance with an aggregated VLAN configuration, the aggregated VLAN configuration associating the sub-VLAN with a sub-VLAN ID and a super-VLAN ID;

[classifying] classify a data packet originating from a super-VLAN in accordance with the aggregated VLAN configuration, the aggregated VLAN configuration further associating the super-VLAN with a super-VLAN ID and at least one of a plurality of sub-VLAN IDs; and

[exchanging] exchange the sub-VLAN ID for the super-VLAN ID before forwarding the data packet to a MAN and exchanging the super-VLAN ID for the at least one sub-VLAN ID before forwarding the data packet to a customer associated with the at least one sub-VLAN ID.